5a. Stratocaster Upgrade Installation

Revised: November 21, 2019

Before you start, **read these instructions first** to understand what you need to do to install this product.

Assumptions

This upgrade product is designed to use only one Volume and one Tone control for all of your instrument's pickups. These products are designed to control either 3 *(using T3Plus-Switch)* or 4 *(using T4-Switch)* magnetic pickup coils. **Note:** We do not support *Active* (uses batteries) or *Pizeo* pickups.

Tools Needed

You may need one or more of the following tools (not included with purchase) to install this **Pickup Switch Upgrade™** product (see each product for additional specific tool requirements).

- Wire cutters / Wire strippers
- Regular pliers
- Small Phillips & straight slot screwdriver (a 4-way screwdriver can be used as a deep-well socket to remove switch mounting nuts
- Ohmmeter to measure continuity
- Optional: rotary file and electric drill
- Optional: Soldering iron (25/30 watt max.) with fine tip, rosin-core solder .022" dia.

For Loaded Pickguards

To install our Loaded Stratocaster pickguard, remove your old pickguard and replace it with your upgrade. Using the included two grey wire nuts, connect the labeled red and black twisted pair wires to your instrument's output jack wires. Connect the bridge ground wire to the negative wire of your instrument output jack. Upgrades with T3Plus-Switch, see document # 5b in our website document library. Upgrades with T4-Switch see document #5c.

Preamble

Before you start, completely **remove all strings** from your instrument for easy access to its parts. The strings are probably already old and replacing them will make your instrument sound even more *brilliant* after you install this product.

This **Stratocaster Pickguard** Upgrade will have you cutting existing wires on your instrument. You may need to make wire connections, increase the length of existing wires, and remove some wood in your instrument body cavity.

Because you will make changes to your instrument, you need to have a plan to install your product.

See the *Reference Drawing* on a later page of this document. Use a pencil to draw the original circuit of your instrument before proceeding. By recording where wires (and colors) were removed from your instrument, you have a way to restore it to its original condition should it become necessary. Since there is a large variation of pickup switch wiring that spans 50 years, you will need to draw your own pickup switch used in your original circuit

Adding Extra Wire

If your pickup or output wires are too short to easily reach the specified connection of the green terminal strip on the **Pickup Switch Upgrade™** circuit board, here is what to do. Measure out the needed length of the RED or BLACK in the included **PARTS BAG** to permit the wire to reach the applicable connection. A length of 3" (7.62cm) is budgeted for each wire extension. Insert the unstripped end of each wire into the 2-wire UY2 yellow/clear connector and clamp down using regular pliers.

Use pliers to squeeze the UY2 connector top button so it is flush with the body to create a permanent electrical connection. **Verify electrical continuity between the two pickup wires with an ohmmeter (some coil resistance will be present)**. The 71B grey wire nuts are used to make the needed firm and insulated connection to the output jack wires, but let you disconnect the installation if needed.

Note: If either your pickup or output wires use a shielded/braided cable, you will need to solder black wire to the cable because the green terminal strip (J1) does not directly accept shielded cable.

3. STRATOCASTER PICKGUARD

You have received an assembled and tested blank **Stratocaster Pickguard** Upgrade that is designed to install into a standard American Stratocaster guitar. It contains one of our *revolutionary* patented **Pickup Switch Upgrade™** growing family of products, one tone and volume control with matching knobs. No soldering is needed to install this product. You will use your own pickups. The following items are included in a Parts Bag.

- An AweSome Musical Instruments headstock decal to apply to your instrument
- Several business cards to pass out to friends
- An equal length each of black and red insulated wire (to lengthen pickup and output jack wire if needed)
- 4 yellow/clear connectors (UY2) to make pickup wire extension connections if needed
- 2 grey wire nuts (71B) to connect output jack wires to your Stratocaster pickguard upgrade product

Preparation

Remove your strings. Remove your existing pickguard attaching screws. Document your existing wiring (see *Preamble* on page 1) *before* you start.

Disconnect the **output jack** wires from your original pickguard. The wires stay on the output jack.

Cut the **pickup wires** from the 5-way pickup switch so all wires are of maximum length. If needed, disconnect the bridge ground wire. Remove your original pickguard. Temporarily stow the output jack wires within the body cavity.

Confirm that the **Stratocaster Pickguard** Upgrade product you received will lay completely flat and within the routed body cavity with no interference by the wood body. If the **Stratocaster Pickguard** Upgrade lays flat on your instrument, proceed to the next section, *Terminal Strip,* to continue with the upgrade process.

If your **Stratocaster Pickguard** Upgrade does not lay flat, your body cavity may have a non-standard dimension preventing the upgrade product from being installed. See *Solving Installation Issues* on page 9 to easily resolve this issue.

Terminal Strip

Here is how to attach wires to the **green** terminal strip (J1) that is on the printed circuit board. Use a small screwdriver or writing pen tip and press down on the square *release button* located directly above the wire hole. Hold the button down and insert the stripped wire completely into the wire connection hole and then release the button. Lightly tug on the wire to confirm it is firmly gripped by the Terminal Strip. A legend is printed on the circuit board with the name of each terminal strip wire hole from left to right. Attach each wire to the correct terminal strip hole. In all instances, connect the **GND** and **VOL** wires from the Volume/Tone control circuit displayed in **Figure 2** to the wire connection holes on the terminal strip.

```
T3Plus-Switch  (8-hole terminal strip): [GND] [VOL] [+]Coil-3[-] [+]Coil-2[-] [+]Coil-1[-]
T4-Switch (10-hole terminal strip): [GND] [VOL] [+]Coil-4[-] [+]Coil-3[-] [+]Coil-2[-] [+]Coil-1[-]
```

Caution: *Do not insert hard items in the wire holes because it will decrease reliable electrical connection.*

Connecting Your Wires

There is no industry standard for pickup wire lead colors. More common color pairs are red/black, red/white, black/white and white/shield. You are advised to use consistency when connecting *your* pickup wire color pairs to the **[+]** and **[−]** pickup connections on the green terminal strip (J1).

Determine which wire color for each pickup coil will be attached to the applicable **[+]** and **[−]** green terminal strip connector on our PTM board. If one of the pickup wire connections is a shielded lead, always connect the shield to a BLACK **[−]** wire to be inserted in the green terminal strip on our switching system.

Determine if there is enough wire length from each 2-wire pickup coil to *comfortably* reach the corresponding connectors on the green terminal strip on the **Pickup Switch Upgrade™** printed circuit board. If not, refer to the *"Adding Extra Wire"* topic (page 1 of this document).

WARNING: If your pickups have a metal bottom and if either pickup coil wire is grounded to this housing (use an ohmmeter to check each wire to body), make sure your instrument's body cavity is not lined with grounded metal shielding and the pickup housing does not have a separate grounding wire.
Reason: This will cause the pickup to "short" to ground when the pickup switch is put into the regular/reverse phase. To fix this, isolate the pickup housing from the body cavity shielding with soft foam.

Strip off 3/16" (4.76mm) insulation from the end of each pickup wire and also the output jack wires then twist the exposed wire strands so they are tightly bound. Insert the wires of each pickup pair into the correct location on the green terminal strip (J1) using the process described in the above *"Terminal Strip"* topic. Attach the wires using either of the following instructions.

Use the two gray wire nuts (71B) to connect the wires labeled "OUTPUT JACK" to the wires on your instrument **output jack**. The red wire goes to the hot lead (normally red) on the output jack and the black wire goes to the ground lead on the output jack. You "screw on" the gray wire nuts by twisting them in a clockwise direction onto the wire pairs.

Note: If you have a ground wire coming from the bridge (and maybe from body cavity shielding), connect them to ground lead on the output jack.

Connecting your pickups to our T3Plus-Switch

If your instrument contains three single-coil pickups (SSS):
Connect your **NECK** pickup coil wire pair to the **[+]**Coil-3**[-]** connections on the green terminal strip
Connect your **MIDDLE** pickup coil wire pair to the **[+]**Coil-2**[-]** connections on the green terminal strip
Connect your **BRIDGE** pickup coil wire pair to the **[+]**Coil-1**[-]** connections on the green terminal strip. [1]

[1] If you purchased an HSS pickguard with our T3Plus-Switch and you have a 2-wire humbucker pickup, connect it to the green terminal strip as described above. If it is a 4-wire pickup, you need to correctly wire it (either in series or in parallel) to be a 2-wire pickup – or just use one of the pickup coil wire pairs (the other coil pair can be taped off.) Our website's **Document Library** contains information to help. Refer to documents #D and #E.

T3Plus-Switch Product Identification and Use Summary

Here is a summary of switch use for this product (see **Figure 1** for switch identification).

Document #E will help you "map" the pickup tones you get from the T3Plus-Switch. It is available for download from our website's Document Library at **https://www.AweSome-Guitars.com**

SW1, SW2 and SW3 are ON-OFF-ON switches that turn on individual pickups in normal or reverse phase
SW4, SW5 and SW6 are ON-ON switches that change select pickups from *parallel* to *series* connectivity

For a Right-Handed Instrument:
SW1 turns on the **bridge** pickup (Coil-1), either in normal phase (down), or reverse phase (up).
SW2 turns on the **middle** pickup (Coil-2), either in normal phase (down), or reverse phase (up).
SW3 turns on the **neck** pickup (Coil-3), either in normal phase (down), or reverse phase (up).

*When all of the following switches are **down**, the pickups will be in a Parallel circuit.*

SW4 when this switch is **up** it puts the **bridge** and **middle** pickups in series. Both pickups must be on. [1]
SW5 when this switch is **up** it puts the **bridge** and **neck** pickups in series. Both pickups must be on.[1]
SW6 when this switch is **up** it puts the **neck** and **middle** pickups in series. Both pickups must be on. [1]
SW4+SW6 when these switches are **up**, all three pickups in *series*. All pickups must be on. SW5 has no effect.

[1] The remaining *non-series* pickup may be either off -or- on (either in regular or reverse phase).

Connecting your pickups to our T4-Switch

If your instrument contains one 4-wire humbucker pickup and two single-coil pickups (HSS):

Connect your **NECK** pickup coil wire pair to the **[+]**Coil-4**[-]** connections on the green terminal strip
Connect your **MIDDLE** pickup coil wire pair to the **[+]**Coil-3**[-]** connections on the green terminal strip
Connect your **BRIDGE1** pickup coil wire pair to the **[+]**Coil-2**[-]** connections on the green terminal strip [1]
Connect your **BRIDGE2** pickup coil wire pair to the **[+]**Coil-1**[-]** connections on the green terminal strip [1]

[1] Assumes that the bridge pickup position contains a 4-wire humbucker pickup

If your instrument contains two two 4-wire humbucker pickups (HH):

Connect your **NECK1** pickup coil wire pair to the **[+]**Coil-4**[-]** connections on the green terminal strip
Connect your **NECK2** pickup coil wire pair to the **[+]**Coil-3**[-]** connections on the green terminal strip
Connect your **BRIDGE1** pickup coil wire pair to the **[+]**Coil-2**[-]** connections on the green terminal strip
Connect your **BRIDGE2** pickup coil wire pair to the **[+]**Coil-1**[-]** connections on the green terminal strip

T4-Switch Product Identification and Use Summary

Here is a summary of switch use for this product (see **Figure 1** for switch identification).

Document #F will help you "map" the pickup tones you get from the T4-Switch. It is available for download from our website's Document Library at **http://www.AweSome-Guitars.com**

SW1, SW2, SW3 and SW4 are ON-OFF-ON switches that turn on individual pickups in normal or reverse phase
S5N and S5B are ON-ON switches that change select pickup coils from *parallel* to *series* connectivity

For a Right-Handed Instrument:

SW1 turns on pickup coil-1, either in normal phase (down), or reverse phase (up). Center is off.
SW2 turns on pickup coil-2, either in normal phase (down), or reverse phase (up). Center is off.
S5B When this switch is **down**, pickup coil-1 and pickup coil-2 will be in a parallel circuit.
When this switch is **up** it puts pickup coil-1 and pickup coil-2 in a series circuit. Both pickup coils must be on, either in normal phase (down) or reverse phase (up).

SW3 turns on pickup coil-3, either in normal phase (down), or reverse phase (up). Center is off.
SW4 turns on pickup coil-4, either in normal phase (down), or reverse phase (up). Center is off.
S5N When this switch is **down**, pickup coil-3 and pickup coil-4 will be in a parallel circuit.
When this switch is **up** it puts pickup coil-3 and pickup coil-4 in a series circuit. Both pickup coils must be on, either in normal phase (down) or reverse phase (up).

Validating

Connect your instrument to an amplified source with the volume set to low. Turn the switches on and off as described in *"Switch Identification and Use Summary"* topic while gently tapping the magnet of the pickup coil that should be "on" with a small screwdriver to confirm pickup response. Also confirm the correct operation of the Volume and Tone controls.

Left hand use note: Our VT-2 Volume-Tone Control assembly is only available as right-hand audio taper item.

If you receive the stated results, install the upgrade pickguard using the previously removed screws. Next, install a new set of strings. Welcome to the *Grand Canyon Wide* range of AweSome pickup tones.

These are products that give your 3-pickup coil and 4-pickup coil instruments a HUGE spectrum of sounds ranging from Muddy/Dirty Blues -*to*- Classic Jazz -*to*- Ring-in-a-bell Surf -*to*- Intense Country Twang and will even give you those elusive out-of-phase *Tin-Canny* pickup tones. After this **Pickup Tone Multiplier™** switching system is installed, you can duplicate the sound of virtually every electric guitar (or electric bass) ever made; including a Stratocaster, Telecaster, Les Paul Custom or Studio, Silvertone, National, Mosrite, Airline, Danelectro, Supro, Harmony, Kay, Maestro, Valco, Red Special or any electric guitar that has ever been manufactured! In fact, this product will produce *dozens* of unique pickup sounds that you have NEVER even heard before.

Figure 1 – Pickguard Switch Identification

The following image shows how the switches are laid out for both the right-hand and the left-hand pickguard.

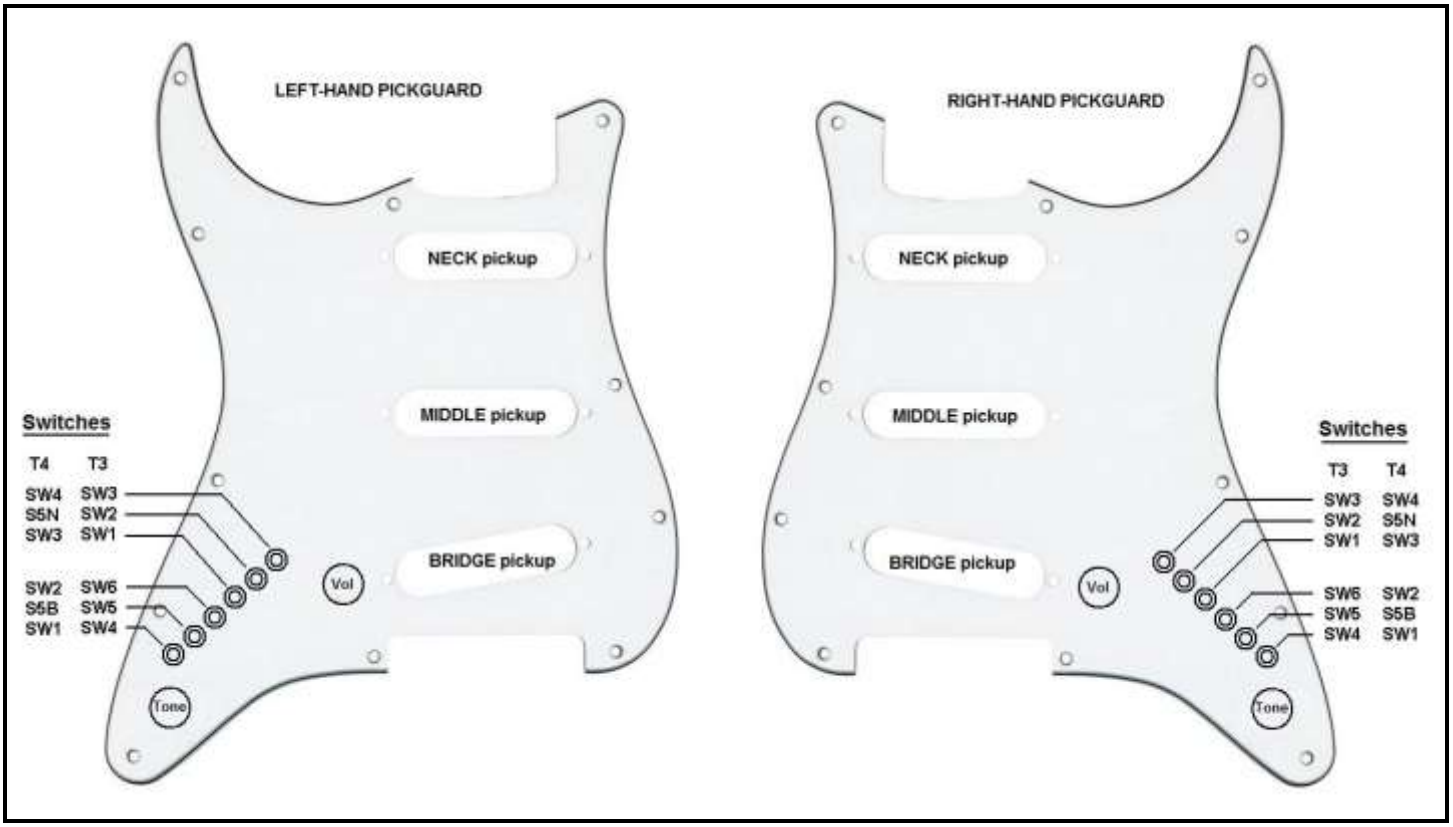
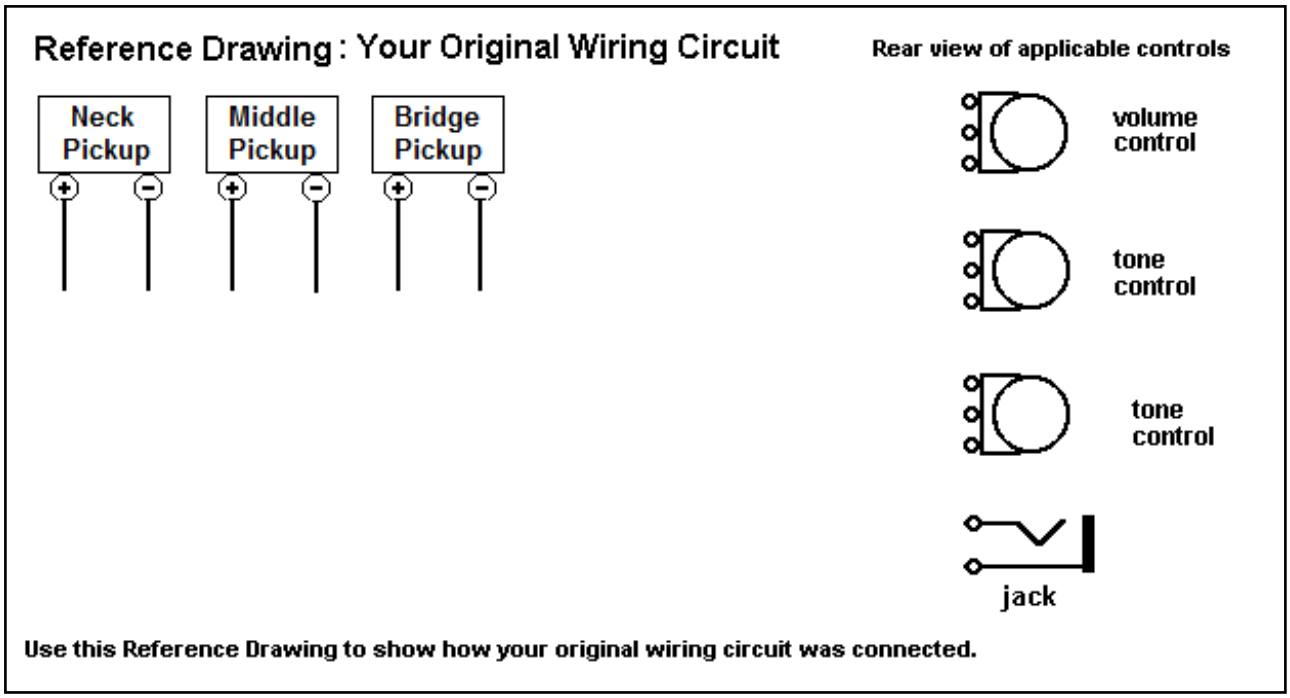


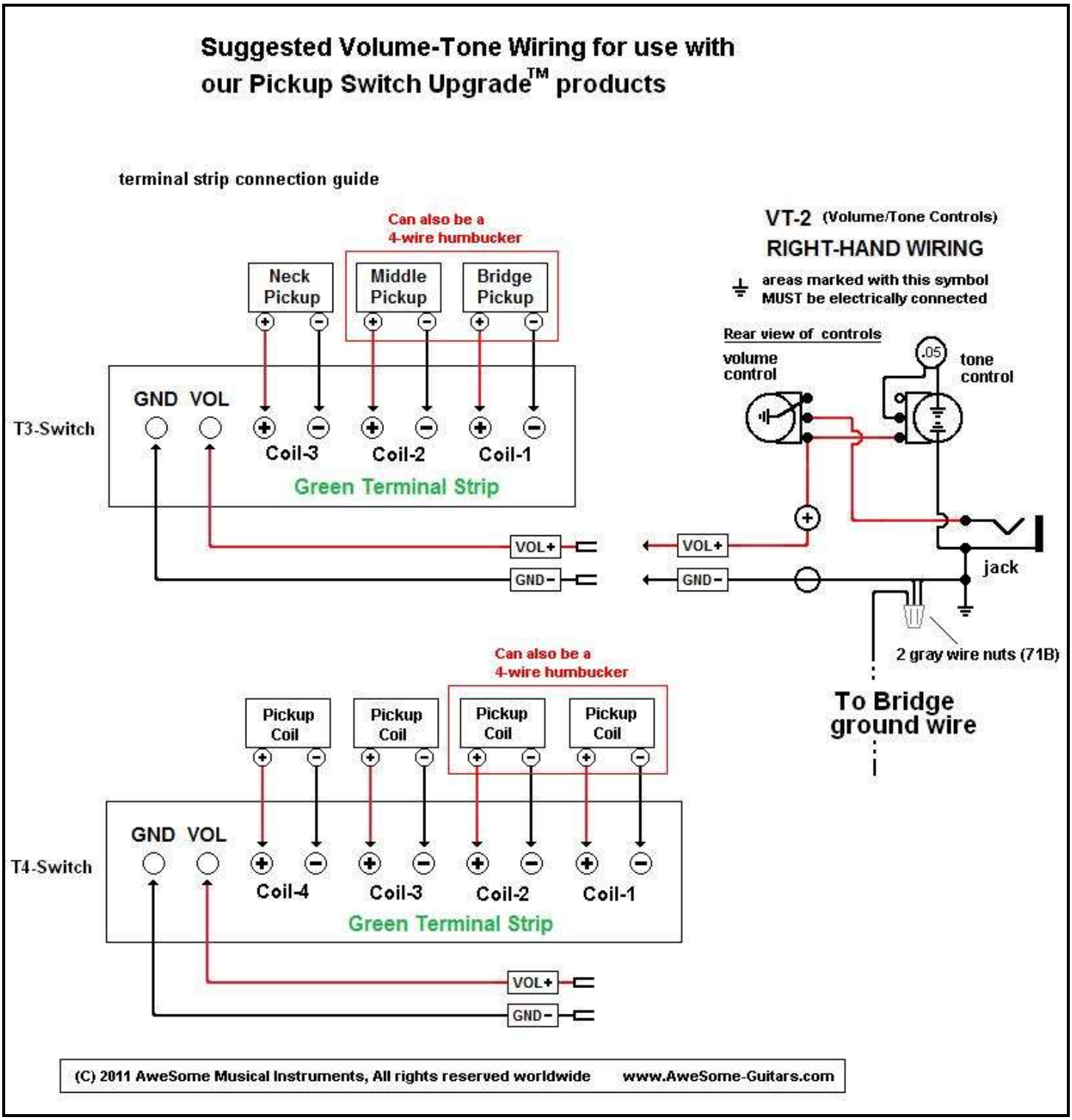
Figure 2 – Reference Drawings

Use the following image to document your instrument's original wiring. Be sure to identify wire colors where needed. Use a pencil when doing this. You need to draw the pickup switch in your instrument.



The following drawing identifies where to connect your pickups and output jack to our **Pickup Switch Upgrade™** product. The **Stratocaster Pickguard** Upgrade includes our VT-2 Volume-Tone Control assembly that is only available in Right-Hand audio taper.

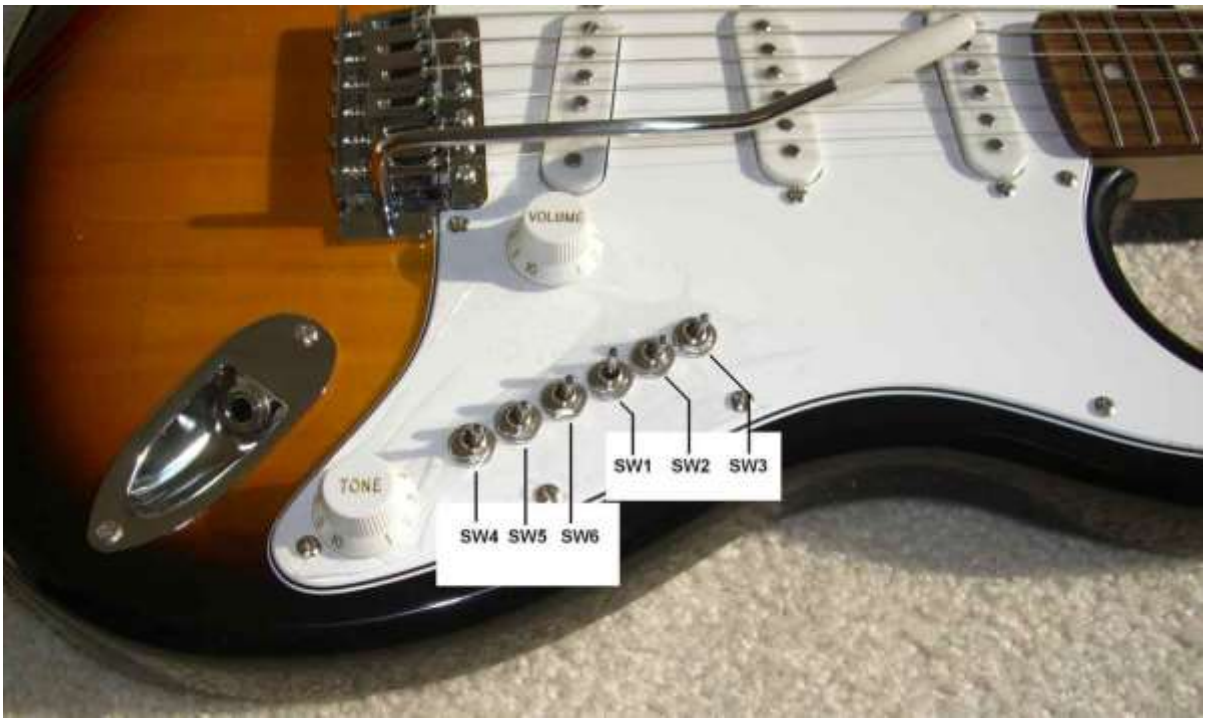
Left hand use note: Our VT-2 volume/tone pot control products are only available in Right-Hand audio taper.



HOW THE T3Plus UPGRADE SWITCHES WORK:

Here is how the mini-toggle switches are laid out from rear to front:

```
(rear)   SW4   SW5   SW6    SW1   SW2   SW3   (front)
```



There are really two *"groups"* of switches: (SW4, SW5, SW6) -*and*- (SW1, SW2, SW3)

The first group of switches (SW1, SW2 and SW3) are ON-OFF-ON switches used to turn an individual pickup Off and On. The middle position of each switch is Off. The down position turns the pickup On (in *normal-phase*) and the Up position turns the pickup on (in *reverse-phase*). Pretty simple, don't you agree?

Switch SW1 controls the Bridge pickup,
Switch SW2 controls the Middle pickup and
Switch SW3 controls the Neck pickup.

When you use these three switches ***(with switches SW4, SW5, SW6 all in the Down position)***, you will get 13 different pickup tones from the various combinations of three pickup coils being Off or On (either in *normal-phase* or in *reverse-phase*). These pickup tones are also due to the combination of pickup coils being in a **Parallel circuit**.

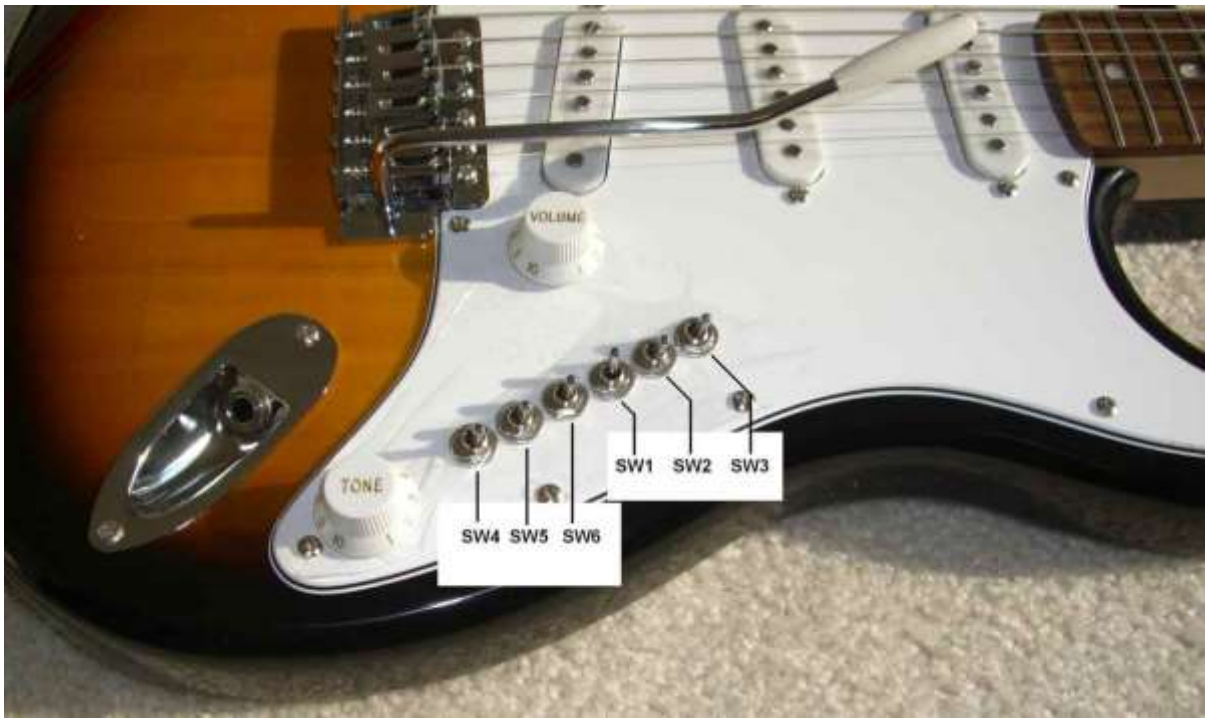
The second group of switches (SW4, SW5 and SW6) are ON-ON switches are used to put select pickups into a **Series circuit**. When you are using this second group of switches:

- When you put two or three pickups in a Series circuit, you create a *"compound"* (i.e., Humbucker) pickup that gives you about 8 to 15 percent More output signal (that gives you an incredible Heavy Metal/Jazz tone).

- All pickups that are in a Series circuit **MUST** be On (either in *normal-phase* or *reverse-phase*). Any non-Series circuit pickup can be either Off or On (either in *normal-phase* or *reverse-phase*).

Using the Second Group of Switches

Starting with all three switches SW4, SW5 and SW6 in the Down position;



- If you only put switch **SW4** Up, this puts both the Bridge pickup and Middle pickup into a Series circuit. This means you MUST turn On both the Bridge pickup and the Middle pickup using switches SW1 and SW2 (either in *normal-phase* or *reverse-phase*) to hear any sound. In this example, the Neck pickup (controlled by SW3) can be either Off or On (in *normal-phase* or *reverse-phase*).

- If you only put switch **SW5** Up, this puts both the Bridge pickup and Neck pickup into a Series circuit. This means you MUST turn On both the Bridge pickup and the Neck pickup using switches SW1 and SW3 (either in *normal-phase* or *reverse-phase*) to hear any sound. In this example, the Middle pickup (controlled by SW2) can be either Off or On (in *normal-phase* or *reverse-phase*).

- If you only put switch **SW6** Up, this puts both the Middle pickup and Neck pickup into a Series circuit. This means you MUST turn On both the Middle pickup and the Neck pickup using switches SW2 and SW3 (either in *normal-phase* or *reverse-phase*) to hear any sound. In this example, the Bridge pickup (controlled by SW1) can be either Off or On (in *normal-phase* or *reverse-phase*).

- If you put both switches **SW4** and **SW6** Up, this puts all three pickups into a Series circuit. This means you MUST turn On ALL of the pickups using switches SW1, SW2 and SW3 (either in *normal-phase* or *reverse-phase*) to hear any sound. This gives you an incredible overdriven heavy metal / jazz sound in spades.

In summary, the various combinations and positions of these six switches will give you 35 pickup tones.

You can freely download the instructions for using our T3Plus-Switch and the companion worksheet to "map" all the pickup tones here: http://www.awesome-guitars.com/docs/Stratocaster-T3-Switch-Use.pdf

For T4-Switch use information, see document #5c at our website document library.

Solving Installation Issues

Here is how to solve installation issues that involve insufficient body cavity width and/or depth.

1. The mounting holes for the **Stratocaster Pickguard** Upgrade do not line up with the body mounting holes.

You will need to re-drill the needed body holes for the pickguard mounting holes. *(see explanation below)*

2. The **Stratocaster Pickguard** Upgrade does not fit into the body cavity because of insufficient depth.

It appears Fender never imposed rigorous standards on their manufacturing *partners* in China, Malaysia, Indonesia, Mexico, Korea, India, etc. Depending on the manufacturing factory, these instruments may not have pickguard mounting holes in the *standard* American Stratocaster position. In addition, they may have a body cavity that is different than the cavity in the *standard* American Stratocaster. These instruments may have a body cavity depth with two different levels and may require some material removal so the *standard* **American Stratocaster Pickguard** Upgrade that you received will completely lay flat on the body.

To solve these body cavity depth issues, you can use a power drill with a rotary file to remove the needed amount of material in the body cavity to permit installation.

The illustrations (below) identify how to use the electric drill and rotary file bit to remove excess material in the body cavity. Also illustrated are two common rotary file bits. The top one is a rasp bit, the lower one is a scraping bit. Either will work.

When using this procedure, it is recommended that you enlist the help of a friend to firmly hold the guitar body while removing the unneeded wood using the rotary file. Also use a blanket or other material between the guitar body and the working surface to prevent the bottom of the body from being scratched.